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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,391	01/09/2004	Gregory Toker	Q79377	6110
23373	7590	11/13/2006	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			NGUYEN, SANG H	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 11/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/753,391

Applicant(s)

TOKER ET AL.

Examiner

Sang Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 September 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11-14 and 16-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 16-21 and 23-26 is/are rejected.
- 7) ☒ Claim(s) 8, 9, 11-14, and 27-31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Applicant's response to amendment filed on 09/05/06 has been entered. It is noted that the application contains claims 1-9, 12-14, and 16-31 and claim 10 and 15 have been canceled by the amendment filed on 09/05/06.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4 and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over (U.S. Patent No. 6,437,312) in view of Sasaki et al (U.S. Patent No. 6,954,274).

Regarding claims 1-3; Adler et al discloses apparatus for sensing information regarding a surface, comprising:

a first plurality of optical elements (i.e., a first illuminator [518 of figure 5], a first reflector [514 of figure 5]) arranged to acquire reviewing regions (352, 354, 356 of figure 3 is considered to be circle surface or two dimensional surface) of a location (513 of figure 5 or 352, 354, 356 of figure 3) with a linear illuminated portion (520 of figure 5) about a surface (12 of figure 5); and

a second plurality of optical elements (i.e., a second illuminator [526 of figure 5], a second focus of reflector [524 of figure 5]) arranged to acquire height information about said surface (col.11 lines 17-30, a width and height dimension of a lead frame [612 of figure 6]) during acquisition of said viewing regions (352, 354, 356 of figure 3) of the surface (12 of figure 2)); and

said first plurality and said second plurality of optical elements (518, 514, 526, 542 of figure 5) being arranged to simultaneously provide said two dimensional information and said topographical information of the surface (col.10 lines 1-46), wherein said second plurality of illumination optical elements (526, 542 of figure 5) comprises at least one light emitter (i.e., second illuminator [526 of figure 5]) arranged to

illuminate a linear region (20 of figure 5) on said surface (12 of figure 5) from a direction generally perpendicular to said surface (12 of figure 5, for example, light beam of second 526 is parallel to an optical axis [542 of figure 5] and is perpendicular to a surface [512 of figure 5]). See figures 1-6.

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U.S. Patent Oct. 11, 2005 Sheet 11 of 19 US 6,954,274 B2

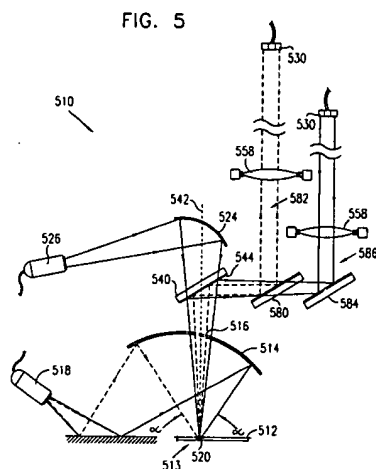
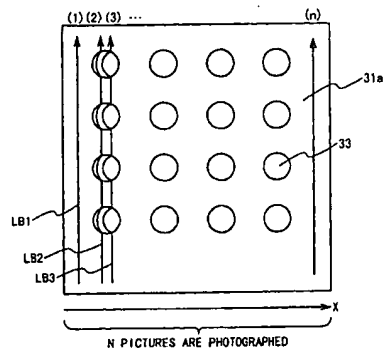


Fig. 10B



Adler et al discloses all of features of claimed invention except for said first plurality and said second plurality of optical elements being arranged to simultaneously provide said two dimensional information and said height profile information to at least partially non-overlapping portions of a single sensor array. However, Sasaki et al teaches that it is known in the art to provide apparatus (figures 10A-10B) having said first plurality and said second plurality of optical elements figure 8) being arranged to simultaneously provide said two dimensional information and said height profile

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information of inspected solder balls (33 of figure 10A) and to at least partially non-overlapping portions of a single sensor array (figure 10B). See figures 1-19.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine apparatus of Adler et al with said first plurality and said second plurality of optical elements being arranged to simultaneously provide said two dimensional information and said height profile information to at least partially non-overlapping portions of a single sensor array as taught by Sasaki et al for the purpose of inspecting accuracy good bumps on the regions of printed circuit board.

Regarding claim 4; Adler et al discloses said first portion of said surface comprises a first elongated region (18, 22, 14, 20 of figure 1) of said surface (13 of figure 1), and said second portion of said surface comprises a second elongated region (26, 42, 14, 20 of figure 1) of said surface (12 of figure 1).

Regarding claim 17; Adler et al discloses said first plurality of optical elements (26, 42, 14 of figure 1) is arranged to view a first portion of said surface (13 of figure 1) from a direction generally perpendicular to said surface (12 of figure 1).

Regarding claim 18; Adler et al discloses said second plurality of optical elements (18, 22, 14 of figure 1) is arranged view a second portion of said surface (12 of figure 1) from a direction angled with respect to said surface.

Regarding claim 19; Adler et al discloses all of features of claimed invention except for said second plurality of optical elements is arranged view a second portion of said surface from a direction angled with respect to said surface. It would have been obvious to one having ordinary skill in the art at the time the invention was made to

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combine the apparatus of Adler et al with said second plurality of optical elements is arranged view a second portion of said surface from a direction angled with respect to said surface, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. In re Einstein, 8 USPQ 167.

Regarding claim 20; Adler et al discloses all of features of claimed invention except for said first portion is illuminated by illumination provided at a plurality of angles relative to said surface. However, Nishimura et al teaches that it is known in the art to provide said first portion (4 of figure 1) is illuminated by illumination provided at a plurality of angles (figure 2) relative to said surface 2 of figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine apparatus of Adler et al with illumination provided at a plurality of angles relative to said surface as taught by Nishimura et al for the purpose of inspecting accuracy good bumps on the regions of printed circuit board.

Regarding claim 21; Adlet et al discloses said second portion (26 of figure 1) is illuminated by illumination that is provided from a direction generally normal to said surface (12 of figure 1).

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adler et al in view of Sasaki et al as applied to claim 1 above, and further in view of Amir et al (U.S. Patent No. 5,127,061).

Regarding claim 5; Adler et al in view of Nishimura et al discloses all of features of claimed invention except for a displacer operative to provide mutual displacement between said surface and said first plurality of optical elements during acquisition of

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said two dimensional information. However, Amir et al teaches that it is known in the art to provide a displacer (considered to be a mirror (30 of figure 1) operative to provide mutual displacement by an actuator (50 of figure 1) between said surface 12 of figure 1) and said first plurality of optical elements (16, 24 of figure 1) during acquisition of said two dimensional information (34 of figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine apparatus of Adler et al with a displacer operative to provide mutual displacement between said surface and said first plurality of optical elements during acquisition of said two dimensional information as taught by Amir et al for the purpose of scanning accuracy the light to the surface with high speed.

Regarding claim 6; Adler et al discloses said first portion of said surface comprises a first elongated region (18, 22, 14, 20 of figure 1) of said surface (13 of figure 1), and said second portion of said surface comprises a second elongated region (26, 42, 14, 20 of figure 1) of said surface (12 of figure 1) at least partially non-overlapping with said first elongated region.

Regarding claim 7; Adler et al in view of Sasaki et al discloses all of features of claimed invention except for said displacer being further operative to provide mutual displacement between said surface and said second plurality of optical elements during acquisition of said topographical information. However, Amir et al teaches that it is known in the art to provide a displacer (considered to be a mirror (30 of figure 1) operative to provide mutual displacement by an actuator (50 of figure 1) between said surface 12 of figure 1) and said first plurality of optical elements (18, 24 of figure 1)

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during acquisition of said two dimensional information (34' of figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine apparatus of Adler et al with said displacer being further operative to provide mutual displacement between said surface and said second plurality of optical elements during acquisition of said topographical information as taught by Amir et al for the purpose of scanning accuracy the light to the surface with high speed.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adler et al in view of Sakaki et al as applied to claim 1 above, and further in view of Shipley(U.S. Patent No. 6,587,600).

Regarding claim 16; Adler et al and Sasaki et al discloses all of features of claimed invention except for said at least one light emitter comprises at least one laser emitter emitting structured light. However, Shipley teaches that it is known in the art to provide at least one laser emitter (110A of figure 2) emitting structured light. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine apparatus of Adler et al with at least one laser emitter emitting structured light as taught by Shipley for the purpose of providing high transmitting light beam to the surface.

Claims 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over (U.S. Patent No. 6,437,312) in view of Sasaki et al (U.S. Patent No. 6,954,274).

Regarding claim 23; Adler et al discloses apparatus for sensing information regarding a surface, comprising:

a first plurality of optical elements (i.e., a first illuminator [518 of figure 5], a first reflector [514 of figure 5]) arranged to acquire viewing regions (352, 354, 356 of figure 3) of the portion (20 of figures 2-3) (col.9 lines 1-25) about the surface (12 of figure 2); and

a second plurality of optical elements (i.e., a second illuminator [526 of figure 5], a second focus of reflector [524 of figure 5]) arranged to acquire height information about said surface (i.e., col.11 lines 17-30, a width and height dimension of a lead frame [612 of figure 6]) during acquisition of said viewing regions (352, 354, 356 of figure 3) of the surface (12 of figure 2), wherein said second plurality of optical elements (i.e., a second illuminator [526 of figure 5], a second focus of reflector [524 of figure 5]) comprising an illuminator (526 of figure 5) for illuminating a first portion of said surface (12 of figure 5) from a direction being generally perpendicular to said surface (12 of figure 5, for example, light beam of second 526 is parallel to an optical axis [542 of figure 5] and is perpendicular to a surface [512 of figure 5]). See figures 1-6.

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FIG. 5

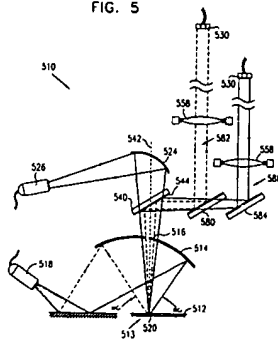
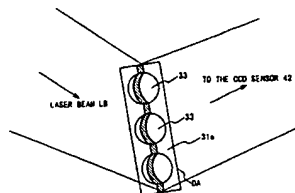


Fig. 10A



Adler et al discloses all of features of claimed invention except for acquire two dimensional information about surface. However, Sasaki et al teaches that it is known in the art to provide apparatus (figures 10A-10B) for acquiring the two dimensional information and height (figures 10A-10B and 19) of the surface of the inspected solder balls (33 of figure 10A). See figures 1-19.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine apparatus of Adler et al with acquire two dimensional information about surface as taught by Sasaki et al for the purpose of inspecting accuracy good bumps on the regions of printed circuit board.

Regarding claim 24; Adler et al discloses all of features of claimed invention except for said first plurality of optical elements are arranged to acquire said two dimensional information from a direction being generally perpendicular to said surface. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the apparatus of Adler et al with said first plurality of optical elements are arranged to acquire said two dimensional information from a direction being generally perpendicular to said surface, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. In re Einstein, 8 USPQ 167.

Regarding claims 25-26; Adler et al discloses all of features of claimed invention except for said second plurality of optical elements are arranged to acquire said height information from a direction being generally nonperpendicular to said surface. It would have been obvious to one having ordinary skill in the art at the time the

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invention was made to combine the apparatus of Adler et al with said second plurality of optical elements are arranged to acquire said topographical information from a direction being generally nonperpendicular to said surface, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. In re Einstein, 8 USPQ 167.

Allowable Subject Matter

Claims 8-9 11-14, 22, and 27-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record, taken alone or in combination, fails discloses or render obvious apparatus for sensing information regarding to a surface comprising all the specific elements with the specific combination including of said first plurality of optical elements comprises an imaging lens shared with said second plurality of optical elements, said imaging lens receiving acquired two dimensional information and acquired topographical information in set forth limitation of claim 8.

The prior art of record, taken alone or in combination, fails discloses or render obvious apparatus for sensing information regarding to a surface comprising all the specific elements with the specific combination including of said first plurality of illumination optical elements comprises at least one light emitter arranged to provide illumination at least some illumination from within a first range of converging angles relative to a first axis, and additional illumination from within a second range of converging angles relative to said first axis in set forth limitation of claim 11.

The prior art of record, taken alone or in combination, fails discloses or render obvious apparatus for sensing information regarding to a surface comprising all the specific elements with the specific combination including of an optical path distance between said first portion and said single sensor array is equal to an optical path distance between said second portion and said single sensor array in set forth limitation of claim 22.

The prior art of record, taken alone or in combination, fails discloses or render obvious apparatus for sensing information regarding to a surface comprising all the specific elements with the specific combination including of further comprising a beam combiner: said first plurality of optical elements and said beam combiner define a first optical path for viewing a first portion of said surface from a direction generally perpendicular thereto; and said second plurality of optical elements and said beam combiner define a second optical path for viewing a second portion of said surface from a generally non-perpendicular angle in set forth limitation of claim 27.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gross et al (7078650) discloses micro-machining employing multiple; Arai et al (6521866) discloses laser beam machininh and laser beam machine; Caspi (5774572) discloses automatic visual inspection system; Tokura (5293324) discloses method and apparatus for inspection solder portions; Takagi et al (5166985) discloses method and apparatus for inspecting surface patterns; or Taft et al (4741621) discloses geometric surface inspection system.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

November 2, 2006


Sang Nguyen
Patent Examiner
Art Unit 2877